

	Type	Hits	Search Text	DBs	Time Stamp
1	IS&R	623	(705/50,51,52,57,65).CCLS.	USPAT	2002/10/30 12:53
2	BRS	116	((705/50,51,52,57,65).CCLS.) and ((decod\$ or decrypt\$) near4 ((personal or custom\$ or user or pin) near4 (key or code)))	<i>Conq'd. All</i> (AP, KWA, E) USPAT	2002/10/30 09:11
3	BRS	8	("5235642" "5337357" "5481720" "5490216" "5586186" "5612889" "5649185" "5754761").PN.	USPAT	2002/10/30 08:56
4	BRS	5	5982892.URPN.	USPAT	2002/10/30 08:58
5	BRS	27	("4644493" "4658093" "4683553" "4683968" "4685055" "4688169" "4796220" "4866769" "4999806" "5103476" "5179591" "5182770" "5199066" "5210795" "5259029" "5311594" "5337357" "5379433" "5420926" "5440631" "5490216" "5555304" "5563947" "5586186" "5625690" "5636277" "5652793").PN.	<i>Conq'd. All</i> USPAT	2002/10/30 09:12
6	BRS	2	6005935.URPN.	USPAT	2002/10/30 09:15
7	IS&R	1	("6005935").PN.	USPAT	2002/10/30 12:53

6/9/5 (Item 2 from file: 275)

DIALOG(R) File 275:Gale Group Computer DB(TM)

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01947826 SUPPLIER NUMBER: 18385235 (THIS IS THE FULL TEXT)

IBM proposes foundation for electronic commerce. (IBM introduces cryptographic envelopes deployed with InfoMarket service) (Company Business and Marketing)

Rosen, Michele

MIDRANGE Systems, v9, n8, p32(2)

May 24, 1996

ISSN: 1041-8237 LANGUAGE: English

RECORD TYPE: Fulltext; Abstract

WORD COUNT: 543 LINE COUNT: 00047

ABSTRACT: IBM wants Web users to utilize its new InfoMarket service, which now features cryptographic envelopes or 'cryptolopes,' a technology that may serve as the foundation for electronic commerce. InfoMarket is a clearinghouse where users can purchase data from thousands of content providers. Cryptolopes technology is a mix of sophisticated zip technology and RSA encryption, as well as a 'rights management language.' The keys to cryptolopes are independent distribution and billing systems and selective encryption. Cryptolopes can contain encrypted data and unencrypted data. They are different from other distribution mechanisms because billing is separate from the **distribution of content**. Cryptolopes are also characterized by versatility and open standards.

TEXT:

NEW YORK -- "Have you 'loped today?"

That's the question IBM is asking Web surfers thirsty for information in the hope they will use its new InfoMarket service to quench their thirst.

"'Loped" refers to cryptolopes, a.k.a. cryptographic envelopes, a new technology being deployed for the first time with Info-Market, a clearinghouse where users can buy information from thousands of content providers. Although they only serve a supporting role for the new service, IBM has high hopes for cryptolopes, according to InfoMarket VP Jeff Crigler, who recently articulated a sweeping vision for what cryptolopes could become -- nothing less than the foundation for electronic commerce on the Internet.

IBM explains cryptolopes as a combination of sophisticated zip technology with RSA encryption and a "rights management language." But the real key to cryptolopes is two-fold: selective encryption and independent distribution and billing systems.

In addition to the encrypted information, cryptolopes can contain unencrypted information about what's inside. For a cryptolope that contains a news article, for example, this "label" can include the title, author, price, terms of use, and even the first paragraph or an abstract of the article.

One of the main differences between cryptolopes and other distribution methods is that the distribution of content is independent from the billing system. In most cases, users pay once for intellectual property to obtain a copy that can be redistributed. Because cryptolopes are permanently encrypted, copies distributed by diskette, E-mail or other secondary distribution system must be paid for by anyone attempting to read the contents. The cryptolope knows how to phone home, contacting the clearinghouse whenever a cryptolope is opened.

Crigler emphasizes that cryptolopes are based on open standards, and he hopes those standards will be adopted by other developers. "We looked specifically for something non-controversial" on which to base cryptolopes, he says, referring to zip technology. IBM intends to publish enough details about cryptolopes so other developers can create their own cryptolope factories and clearinghouses.

Because of their versatility and open standards, Crigler hopes cryptolopes will be used to sell everything from news articles to software to hard goods. The invoice for a hard good, such as a book, could be enclosed in a cryptolope and sent to the buyer. When the buyer opens the cryptolope, payment for the book would be added to their bill and credited to the seller's account. "Cryptolopes will allow publishers (and presumably others) to set up real business on the Web," he says.

IBM also hopes the simplicity of the payment system will help spread the use of cryptolopes. Rather than reinventing the wheel, InfoMarket users supply a credit card number to the service. Purchases will be accumulated to a monthly bill, eliminating the problem of micropayments, or payments too small to be feasible because of credit card fees. "There's been a lot of smoke and very little fire concerning payment systems," he says.

For now, users will have to download a helper application to decipher the cryptolopes. A later version of will incorporate Java applets that will be downloaded with the cryptolope, so the helper app will no longer be necessary.

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SPECIAL FEATURES: illustration; other

COMPANY NAMES: International Business Machines Corp.--Services

DESCRIPTORS: Electronic Commerce; Encryption; Company Service

Introduction

TICKER SYMBOLS: IBM

FILE SEGMENT: CD File 275

?

6/9/7 (Item 4 from file: 275)
DIALOG(R) File 275:Gale Group Computer DB(TM)
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01639091 SUPPLIER NUMBER: 15323542

DirectTV service takes to the air on time. (Hughes Aircraft Corp. debuts direct broadcast satellite service)

Wirbel, Loring

Electronic Engineering Times, n791, p8(1)

April 4, 1994

ISSN: 0192-1541

LANGUAGE: ENGLISH

RECORD TYPE: ABSTRACT

ABSTRACT: Hughes Aircraft Corp's DirectTV satellite-based direct television broadcasting service began delivering more than 20 channels to beta-site homes by the firm's self-imposed Apr 1994 deadline. The service **broadcasts** a single **encrypted**, compressed **data** stream at 17 GHz from four 13-meter antennas at its \$100 million Castle Rock Broadcast Center in Colorado to a single geostationary satellite. The satellite relays the signals to home subscribers **utilizing** a \$600 combination of 18-inch receiver antenna, set-top converter and smart-card controller that provides decryption and authorization. The set-top boxes include RS-232 ports for linking to microcomputers or phone lines for **billing**. The DirectTV system has the capability of return-path services, which are required for interactive television functions, though the services would likely be provided through telephone services. The current satellite has a capacity of 50 channels, but a second satellite to be launched in Jun 1994 will add 150 more channels.

COMPANY NAMES: Hughes Aircraft Co.--Services

DESCRIPTORS: Direct Satellite Communications; Television; Information Services; System Design; New Product

SIC CODES: 4899 Communication services, not elsewhere classified; 3812 Search and navigation equipment; 3761 Guided missiles and space vehicles ; 4841 Cable and other pay TV services

FILE SEGMENT: CD File 275

6/9/12 (Item 2 from file: 148)

DIALOG(R)File 148:Gale Group Trade & Industry DB

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08758141 SUPPLIER NUMBER: 18409890 (THIS IS THE FULL TEXT)
Data from above. (Hughes Network Systems' DirecPC satellite service)
(Company Business and Marketing)

Thyfault, Mary E.

InformationWeek, n584, p107(1)

June 17, 1996

ISSN: 8750-6874 LANGUAGE: English RECORD TYPE: Fulltext; Abstract

WORD COUNT: 481 LINE COUNT: 00040

ABSTRACT: Hughes Network Systems introduces its DirecPC for NetWare satellite service, which provides NetWare shops with a cost-effective, high-speed solution for **broadcasting** and downloading **information**. The satellite-to-PC service is ideal for simple Internet access at rates of 400 Kbps and for **broadcasting video, images and data** to a substantial number of locations. The service package contains an ISA card, a 21-in elliptical satellite antenna and software based on Windows. Hughes **utilizes encryption** technology to provide communication security. The service will be available in Jun 1996, and enterprises with five-user LANs will be **charged** \$2,300 for the software and hardware, as well as \$80 per month to download 150MB of data. For users downloading directly from the Internet, the cost is \$1,800 plus **usage** fees.

TEXT:

Hughes Network Systems Inc. has tailored its DirecPC satellite service to NetWare shops, giving these companies a high-speed, low-cost option for downloading and broadcasting information.

The NetWare version of Hughes' satellite-to-PC service, to be rolled out this week, is suited for two kinds of applications: basic Internet access at 400 Kbps, or broadcasting data, video, or images to a large number of sites.

For Internet access, users on a NetWare LAN send out a request to pull up a World Wide Web site. The request travels to the Internet service provider, usually over a dedicated line. The service provider reads the request, and instead of connecting directly to a host, sends the request to Hughes, which then pulls the information from a host and sends it to the user's Internet Protocol address via the 400-Kbps satellite link.

Hughes also sees companies using the broadcast feature to send out everything from software and inventory updates to feeds for product training. Beta tester Sunpoint Securities in Longview, Texas, is using DirecPC to send out market quotes and financial news feeds from Standard & Poor's to its brokers in 44 states. Sunpoint has been looking into using the Internet to download market data for some time, but MIS director Bryan Young has been concerned about response time and security. "This is a giant step in the right direction," Young says. "Stockbrokers require real-time data. The Internet gets awfully slow in the afternoon. A 20-second response time in this business is an eternity."

By using Hughes' satellite links instead of conventional land lines, Sunpoint cut the cost of 56-Kbps transmissions by one-third, Young says. And Hughes encrypts all communications to ensure security. Within a month, Sunpoint brokers will start to buy and sell orders using DirecPC. Within six to 10 months, Young hopes all the company's interoffice data communication will run over the service.

The DirecPC for NetWare package includes a 21-inch elliptical satellite antenna, an ISA card, and Windows-based software. Cisco Systems Inc. provides its Internet Junction gateway, letting companies present a single IP address for its entire Novell community. Cisco also provides a firewall. Startup Helius Inc. in Orem, Utah, provides the LAN-to-satellite integration technology.

Companies with a five-user LAN would pay \$2,300 for the hardware and software, and \$80 a month to download 150 Mbytes of data. If they're just downloading from the Internet, the price is \$1,800 plus usage.

Companies that want to broadcast software or other information to users pay based on the size of the file. Says John Malone, VP of Hughes Network Systems in Germantown, Md.: "We don't penalize you because you're sending to thousands of sites."

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SPECIAL FEATURES: illustration; photograph

COMPANY NAMES: Hughes Network Systems Inc.--Services

INDUSTRY CODES/NAMES: CMPT Computers and Office Automation

DESCRIPTORS: Telecommunications equipment industry--Services

PRODUCT/INDUSTRY NAMES: 4811000 (Telephone Communications)

SIC CODES: 4810 Telephone Communication

FILE SEGMENT: CD File 275

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6/9/1 (Item 1 from file: 15)
DIALOG(R) File 15:ABI/Inform(R)
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01179920 98-29315

The CD/online enablers

Nathans, Stephen

CD-ROM Professional v9n3 PP: 46-56 Mar 1996 ISSN: 1049-0833

JRNL CODE: LDP

DOC TYPE: Journal article LANGUAGE: English LENGTH: 9 Pages

SPECIAL FEATURE: Charts

WORD COUNT: 3480

ABSTRACT: Throughout the industry, the need and demand for CD-ROM/online hybrids and the advantages they can provide are becoming recognized. A number of prominent industry players have entered the field with a wide range of approaches and solutions that illustrate the technology's potential both for diverse implementation and profitability. According to Richard Reisman of CD-ROM/online pioneer Teleshuttle, the emergence of CD-ROM/online hybrids for enhanced data distribution and the metering and sale of distributed proprietary data - like the proliferation of vendors providing tools and services that use the enabling technology - is part of a broader evolution in the industry. The evolution is not so much the evolving technology itself but the sea of change it represents in the conception of CD-ROM from a standalone medium to a component in a more serviceable information distribution chain.

TEXT: Headnote: APART FROM SIMPLE CONNECTIONS-WHETHER FOR DATABASE UPDATES OR LINKING TO ADDITIONAL INFORMATION-CD-ROM/ONLINE TECHNOLOGY CAN ALSO ENABLE "PAY-AS-YOU-GO" METERING AND SECURE SALES OF PROPRIETARY DATA.

As the need and demand for CD-ROM/online hybrids and the advantages they can provide become increasingly recognized throughout the industry, a number of prominent industry players have entered the field with a wide range of approaches and solutions that illustrate the technology's potential both for diverse implementation and profitability.

At one end of the CD-ROM/online professional market spectrum-in terms of services provided-Dataware's NetAnswer connects users of the authoring giant's popular CD Answer retrieval software to existing online servers to address their publishing needs by enormously enhancing their distribution capabilities. Another highend data distribution provider, Teleshuttle takes an alternate approach to getting publishers online by licensing not only an embedded software links system, but also the use of their own full-service server, which has increasingly incorporated Web browsing and publishing capabilities as interest and applications in that area have exploded in recent months.

Apart from simple connectionswhether for database updates or linking to additional information-CD-ROM/ online technology can also enable "payas-you-go" metering and secure sales of proprietary data. Two companies, CD-MAX and Infosafe, are pioneering particularly innovative approaches in this area and partnering their services with various database proprietors to manage highly profitable data distribution.

But there are other efforts underway as well. New companies, like Connect, Inc. and Digital Delivery, are providing CD-ROM/online sales services, and longtime CD-ROM/online technology vendors like Metatec are extending beyond simple replication services to offer a full service bureau for publishers looking to link their CD-ROMs with the day-to-day world.

TELESHUTTLE'S FULL-SERVICE ONLINE SERVER

One of several services that adds the immediacy of online data retrieval with the high storage capacity and fast access to stored data that are CD-ROM's hallmarks, Teleshuttle embeds a specialized software communications module in a conventional CD-ROM to enhance enormously the opportunities for publishers to take advantage of online services both in the development and distribution of their work. The New York-based company

goes a step beyond most products of its kind, however, because not only does it provide the link to an online service, but it supplies the service itself. Providing publishers and other users with quick and economically efficient access to a network of resources, Teleshuttle was originally designed primarily to let publishers outsource their data communications needs to the company's online staff. With pricing administered on a per-task basis, increasing incrementally with the range and depth of the tasks demanded, Teleshuttle's fees adjust much more specifically to user needs than conventional services.

Described as a "transport service" in the company's press materials, Teleshuttle guarantees its subscribers free and easy access to the entire population of modem-equipped users. The company has most recently added Web access to its repertoire of data delivery services. Called "WebShuttle," the solution provides an alternative to data retrieval systems and browsers like Mosaic and Netscape by providing CD-ROM-based access to packages containing working sets of Web pages called Webpaks, a Web browser, and a specially configured Teleshuttle Transporter pre-set for direct-dial access to the company's own Webpak server. The Teleshuttle Web service, like its other offerings, operates independently of the Internet and other online services, while allowing users of the CD-ROM to download selected "Webpaks" to hard disk for offline browsing. The Webpaks can consist of any selection of pages or related images, sounds, and the like-in any format other than HTML--from a user's own Web sites or others, within copyright and licensing limits.

The user's access to the service is enabled by sponsoring the 800 number that connects his modem to the system. Periodic updates to user-chosen Webpaks are triggered by special "Get Update Now" hyperlinks which users can place at their discretion. The first product to use the Teleshuttle Update Service was Vista Intermedia's CD-ROM of the World Health Organization's International Digest of Health Legislation (IDHL). In addition to full-text searching capabilities supplied by Folio Views, the IDHL CD-ROM gives its users quarterly updates of the latest World Health Organization data by means of the embedded Teleshuttle Update software.

Another service Teleshuttle provides is a Drop-In Utility Transporter API, which is designed to allow Teleshuttle users to embed access to the service into any application, with both directdial and Internet connectivity. The Utility Transporter can be dropped onto any disk or CD-ROM without any programmed connection to the title's other contents, and provides update capabilities similar to the Webpak options. One prominent Teleshuttlebased title is Creative Multimedia's Blockbuster Video Guide to Movies and Videos, a CD-ROM movie guide that boasts monthly updates, enabled through the Teleshuttle service. Users of the title click Teleshuttle's "Update" button to connect to UNET, which delivers the new film reviews available for that month to the user's hard disk and then signs off. In this instance, Teleshuttle provides the linkage software but not the actual online service that retrieves the data.

DATAWARE ANSWERS WITH NETANSWER FOR CD ANSWER

(Illustration Omitted)

Longtime authoring and retrieval solution provider Dataware Technologies has paid careful attention to new happenings both on the CD-ROM and the online sides of things, as evinced by its acquisitions of companies and technologies with strong positioning in those industries. So it's not surprising that the company has been quick to position itself prominently in the CD-ROM/online game, entering the market in November 1995 with NetAnswer for CD Answer, a comprehensive, off the-shelf Internet software and services offering based on CD Answer, the company's widely used CD-ROM retrieval software. The product packs a powerful information management, query, and retrieval system for the World Wide Web to enable publishers and other users of the software to distribute sizable volumes of data, text, and content through the Internet. The service debuted with a \$15,000 asking price.

Promising a fast turnkey solution for information providers who intend to

make their content available across the Internet, NetAnswer incorporates extensive accounting and security features for monitoring access to proprietary information. NetAnswer allows CD-ROM publishers to load existing CD Answer CD-ROMs onto an Internet-connected UNIX or Windows NT platform, and uses Dataware services or the user's own to develop HTML filters to enhance and tailor the delivery of the information to Web users worldwide. The capabilities provided in NetAnswer itself include multifielded searches, concept searching, relevance ranking, and user-customized search and display formats.

As a companion piece for users of the software who are not equipped to maintain their own Internet host, Dataware offers NetAnswer Hosting services for quick Internet access and a variety of options, such as server choices and communication bandwidth configurations, data loading frequencies, and support options for specific content types and expected number of users. The system also helps users design custom HTML interfaces and database query and navigation features, and protects the user's document design, automatically translating information published in other formats into HTML for secure Internet delivery.

Incorporating Dataware's server and information management solution, BRS/Search-an industry fixture originally developed for commercial online systems-NetAnswer takes advantage of the BRS database's strengths, such as the management of large collections of unstructured information and enabling multiple users to search, retrieve, and analyze quickly and efficiently stored documents by word, concept, phrase, and combinations of various lengths. Using the BRS/Search interface, NetAnswer provides hundreds of users simultaneous access to databases of 100GB or more through its core search and retrieval capabilities, data security functions, and activity monitoring. A Super Server feature works with Netscape, Spyglass, Mosaic, and other servers to enable users to make their text, graphics, and multimedia material available on the Web.

CD Answer customers include Dun & Bradstreet, the behemoth marketing information clearinghouse whose gargantuan business reference CD, D&B WorldBase, provides rapid online database access to 40GB of Dun & Bradstreet's reference information.

Another user of Dataware CD-ROM/ online hybrid solutions is Toshiba America Information Systems, which makes its maintenance manuals, reference manuals, and parts catalogs available to the company's satellite outposts with the Toshiba Automated Technical Library and Support International (Atlas i) CD-ROM. The disc uses hybrid technology in its updates, search engine, and parts ordering through an online connection to Toshiba's inventory system. Another disc that implements the Dataware online server solution is The Thomas Register on CD-ROM, a comprehensive directory of U.S. manufacturers. Register users can update the information on the disc through a FAX-on-demand service enabled by Dataware's embedded online links.

TMS INC.: EXPRESSING THE ONLINE MASTERVIEW

Another company that has recently debuted a Windows-based CD-ROM/ online hybrid text and imaging retrieval product is TMS Inc., whose MasterView Express provides a range of capabilities for retrieval, hyperlink navigation, and document referencing to the Internet. The service is designed to help business publications distributed on CD-ROM update the constantly changing data which is the bread and butter of their trade.

(Illustration Omitted)

TMS's clients for MasterView Express include the U.S. Bureau of Engraving and Printing, which uses MasterView Express's image-to-image linking function for quick navigation of the bureau's morass of printing press diagrams.

One CD-ROM product, POWERCOM-2000, has for several years incorporated the full-text search, image retrieval, and hyperlink capabilities offered by MasterView Express's fullservice toolkit cousin, MasterView, in its

document conversion and update services. The MasterView-generated product is a set of illustrated parts catalogs, service bulletins, and repair manuals. Even since the early days of CD-ROM/online usage, in addition to text search and retrieval functions, MasterView has enhanced Powercom parts catalog applications by maintaining modem-enabled EDI links between users of the Powercom publications and the parts dealer's hard drive to maintain a constant information flow.

TMS plans to continue using the EDI link rather than an Internet connection in its parts ordering process, according to vice president for sales Rick Scanlan, because many of the outfits that Powercom services are located in small towns where phone calls to Internet outposts incur long-distance charges. But the "biggest opportunity" Scanlan says he sees ultimately for major manufacturers like those who use the Powercom product is in CD-ROM to Web links. In fields like aircraft maintenance, where having up-to-date information is essential for troubleshooting and parts ordering, Scanlan says, Web sites that allow manufacturers to post service bulletins will be a tremendous asset both to those manufacturers and those shops that use the manufacturers' off-the-shelf CD-ROMs for the core of their database and their search and retrieval needs, but will need quick access to any new information not found on the disc. "As the communications infrastructure gets bigger and everyone has access to it in a cost-effective way, online will take on an increasingly large role in information distribution." A self-described "Internet Evangelist," Scanlan continues, "As current technical barriers are removed, with more universal access to the Internet and the Web, online will eventually serve all distribution needs, including those served by optical storage media."

INFOSAFE AND CD MAX: MASTERING THE CD-ROM MARKETING MYSTERY

Another increasingly common application of hybrid technology is being pioneered by CD-MAX and Infosafe, two companies who are using electronic metering technology with CD-ROMs monitored from online sources, to enhance and regulate the marketing of proprietary electronic information sold through CD-ROMs on a pay-as-you-go basis.

The CD-MAX Encryption Solution: A Pay-As-You-Go Policy

(Illustration Omitted)

(Illustration Omitted)

(Illustration Omitted)

(Illustration Omitted)

CD-MAX, a software encryption process developed and marketed by the Murray Hill, New Jersey-based company of the same name, is a security and billing system for electronic information which uses the company's patented encryption and metering technology. For CD-ROMs intended to incorporate information unlocked on a pay-as-you-go basis, CD-MAX's encryption and usage-tracking programs are combined with the publisher's information during the development process. Customers who purchase CD-ROMs that use CD-MAX technology also receive security codes needed to unlock the metered information, and CD-MAX tracks the usage of that information and protects it automatically. Once a month, a file of the usage information is sent from the user's workstation to CD-MAX's billing computer through a modem link. Publishers who use the CD-MAX programs on their titles pay fees that increase incrementally with regard to the degree of encryption services they select.

Publishers currently using CD-MAX technology in their programs include Disclosure, a financial information provider whose Metered New Issues Database is a CD-ROM equivalent to the company's printed corporate debt and equity report, which is updated monthly. The advantage of the CD-ROM product is that, unlike the print version-which users must purchase in toto-it allows users to pay for data based on usage. Another prominent CD-MAX client is Mitchell International, a Thomson Corporation subsidiary that uses CD-MAX encryption and metering in Metered On-Demand, a new

version of its Mitchell On-Demand Repair Information System. The CD-MAX technology used in the product allows Mitchell to register customers, process credit card transactions, track and report information usage, and ensure data security. According to David Boelio, CD-MAX executive vice president for marketing and sales, the Mitchell CD-ROM continues to operate while the installed CD-MAX metering technology performs the product's online communication sequence. Consequently, Boelio says, in less than a minute, we can upload a file that contains a customer's usage information and download new credit information. There's a lot that goes on in the space of a few seconds."

The Infosafe Innovation: Decrypting for Dollars

Design Palette, a 43-disc set of graphics distribution software for CD-ROM developers, is the first available product that incorporates Infosafe's metering technology, which makes it not surprising that the company is closely identified with the product at this point. But the core of the innovative approach that Infosafe Systems brings to the CD-ROM/online scene is the technology itself, specifically in the way that it dictates how the proprietary information in Design Palette is meted and metered.

Its primary instrument, a box with a modem connection, Infosafe Systems is an electronic distribution system which encrypts information and records it on CD-ROMs in order to enable publishers to employ such **encrypted** CD-ROMs as data storage media, and-most of all-to distribute them efficiently and economically to clients who use that data on a subscription basis. Infosafe Systems also provides state of the art protection for that data as it sells it to subscribers on a per-use or information packet basis. While closely monitoring subscriber data **usage** for compiling demographic data, perhaps most importantly, Infosafe monitors that data **usage** remotely, so that each subscriber's account can be examined, verified, and **billed** through the box's modem connection to Infosafe's own **billing** service.

In addition to Design Palette, Infosafe also has numbered among its clientele CD Solutions, a CD-ROM-based developer and marketer of ancillary products and services. The company has also recently announced plans to work with 3M Data Storage Optical Technology in a strategic marketing and sales effort to provide for secure metered distribution of high-value intellectual property and other high-capacity data using Infosafe's patented metering technology.

CDROM/ONLINE SALES SOLUTIONS: A DIRECT-SELLING AND BUYING BONANZA

While many in the industry have been slow to notice or respond to the increasingly evident potential for CD-ROM/ online hybrid technology to change the way information is developed, stored, distributed, and sold electronically, it's hard to ignore the enormous potential for catalog-based and other direct sales over the Internet. Two companies, the Mountain View, California-based online server-supplier Connect, Inc., and Digital Delivery, a Bedford, Massachusetts company whose CatalogBuilder 2.5 is a CD-ROM-based system that enables users to create Internet sales catalogs, represent two different approaches to addressing both the demand for Internet-based sales and publishers' needs for vehicles to enable those sales.

CONNECT's DPDS: One World, One Web, OneServer

(Illustration Omitted)

(Illustration Omitted)

CONNECT, Inc.'s Digital Production Distribution System (DPDS) provides a global distribution channel for publishers who register their databases with the service by enabling the sale and secure delivery of their digital products and information directly to their customers through the Internet and other online services and networks. CONNECT's OneServer-one of several online DPDS product delivery solutions-benefits companies who deal in clip art, photo images, typography, databases and software extensions, and the like, by allowing them to sell globally, reducing the cost of order

acquisition and processing, and eliminating the packaging costs associated with offline sales. Customers using licensed implementations of the OneServer solution can browse and sample products and obtain real-time licensing and delivery.

In September 1995, CONNECT added PhotoDisc Inc., a leading supplier of graphic images on CD-ROM, to its growing clientele. PhotoDisc On-line is an Internet-based merchandising and distribution "electronic storefront" for the company's 10,000-image library. The product uses OneServer DPDS as its platform. OneServer is licensed to companies like PhotoDisc for \$80,000 to \$1.5 million, depending on platform and configuration, and can be accessed through Web browsers and custom client software.

CONNECT CEO and president Tom Kehler sees products like CONNECT's OneServer filling a need in business applications that non-hybrid CD-ROM and online products and services won't be able to satisfy in a hybrid capability harnessing future. Tool sets like OneServer, he says, "are the back-end systems of the online business world, and it's only a matter of time before they will be available as licensed software products. Today's consumer online services simply don't have this kind of functionality. They have the 'show' but no 'go' to deliver products and services."

Digital Delivery: Catalog-Building Commerce Catalysts

Digital Delivery's CatalogBuilder 2.5 is designed as a turnkey software system that enables catalog publishers to display their products in Web- and CD-ROM-based business-to-business, interactive electronic catalogs. Frequently used in the construction of manufacturers' parts catalogs, like Sager Electronics' Industrial Controls and Factory Automation Interactive Catalog CD-ROM, CatalogBuilder increases the efficiency of such catalogs by supplying fast electronic searching and ordering capabilities for the hundreds of thousands of products listed in many current manufacturing catalogs.

Developers of business-to-business catalogs who use CatalogBuilder and its encryption-technology module stablemate, TitleBuilder, can design their own interfaces and delivery platforms and customize the ordering process for the merchandise they sell. While CatalogBuilder uses hybrid technology to enable online sales, TitleBuilder is designed to help users develop discs that include an encryption software module that enables remote monitoring of the use of proprietary information stored on the disc in encrypted form—a pay-as-you-go strategy not unlike those developed by CD-MAX and Infospace.

THE METATEC MONTHLIES: PUBLISHING SOLUTIONS SERVICES

(Illustration Omitted)

The earliest adopter of CD-ROM/ online technology for the professional market was Metatec, a business service provider whose NautilusCD, a monthly multimedia CD-ROM that delivers up-to-date software and multimedia content to an 18,000-strong subscriber base of CD-ROM and online service users, represented the first major entrant in the field. Metatec president Jeff Wilkins, whose 15 years as president of CompuServe aligns his pre-Metatec background rather strongly with the online side, pursued the NautilusCD project, he says, because all signs pointed toward a future that "was going to require multimedia, which is best delivered on CD-ROM." Also convinced of the importance of online services in the information distribution equation, he says, "Eventually, I thought, this was going to be a hybrid world. And this natural evolution of converging technologies is finally starting to come to fruition. And we expect it to play an ever-increasing role."

Metatec's more recent product, CompuServeCD, a CD-ROM complement to the leading online information service, was designed to give CompuServe users services they could not get online, such as more quickly accessed multimedia content. The disc incorporates online links for consumer purchasing and access to extensive databases. Multimedia World LIVE!, a

CD-ROM-based companion piece to the consumer-oriented print magazine Multimedia World, joined NautilusCD and CompuServeCD in Metatec's roster of digital magazine monthlies in July.

Another new partnership finds Metatec joining forces with Harcourt Interactive, a division of Harcourt Brace, to produce interactive CD-ROMs that complement Harcourt Brace's liberal arts and science college textbooks. While the first two titles, Matlin's Psychology and Sternberg's In Search of the Human Mind, do not include online links, the third product in the Metatec-Harcourt line, released in early 199based on an American government textbook-features Internet connections.

THE CD-ROM/ONLINE CONVERGENCE: ELECTRONIC DISTRIBUTION DESTINY

The emergence of CD-ROM/online hybrids for enhanced data distribution and the metering and sale of distributed proprietary data-like the proliferation of vendors providing tools and services that use the enabling technology-is part of a broader "evolution" in the industry, according to Richard Reisman of CD-ROM/online pioneer Teleshuttle. The evolution is not so much the evolving technology itself but the sea of change it represents in the conception of CD-ROM from a standalone medium to a component in a more serviceable information distribution chain.

"CD-ROM and online are increasingly merging together," Reisman says. The convergence has evolved as the industry has increasingly recognized that "local media without online networks are inherently limited, and networks without local media are limited as well." And the vendors and tool developers who have been among the earliest to recognize those limitations and advance the convergence of CD-ROM and online stand to profit immensely from the various uses of the technology that their products enable.

Author Affiliation: Stephen Nathans is Associate Editor of CD-ROM Professional.

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CD-ROM versus online: An economic analysis for publishers

Wiedemer, John David; Boelio, David B

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ABSTRACT: Some in the industry question whether CD-ROM is already a mature technology destined to be replaced by better ways of storing and distributing information. To publishers, charged with the responsibility of devising information delivery strategies, this is not just a theoretical question, but rather one involving issues central to deciding how and when to invest in new electronic publishing technologies. Fortunately, the marketplace will determine the extent of CD-ROM's acceptance and its ultimate fate. Thus far, the marketplace has resoundingly endorsed CD-ROM as the most cost-effective way to deliver information that is not highly time-sensitive. Other distribution media, including commercial online services and the Internet, offer advantages, but cost is not one of them, and CD-ROM's current cost advantage over online distribution will not disappear any time soon. A comparison of the advantages of CD-ROM and online information distribution is presented.

TEXT: CD-ROM: A transitional medium, soon to be eclipsed," or so say some pundits in our industry. Are they right? Is CD-ROM already a mature technology destined to be replaced by better ways of storing and distributing information?

To publishers, charged with the responsibility of devising information delivery strategies, this isn't just a theoretical question, but rather one involving issues central to deciding how and when to invest in new electronic publishing technologies. The stakes--in terms of time, money and human resources--are immense.

Fortunately, the marketplace--not the pundits--will determine the extent of CD-ROM's acceptance and its ultimate fate. Thus far, the marketplace has resoundingly endorsed CD-ROM as the most cost-effective way to deliver information that isn't highly time-sensitive. Other distribution media, including commercial online services and the Internet, offer advantages, but cost isn't one of them, and CD-ROM's current cost advantage over online distribution won't disappear any time soon. On the contrary, it will almost certainly increase in the next few years, due to advances in CD technology. Before selecting an electronic publishing medium, publishers need to consider the nature of their information and their markets. Is the information time-sensitive? Will its value to customers diminish if it's more than a day or a week old? Will customers pay extra for frequent updating and for instant access to information? If the answer to these questions is no, then CD-ROM is the better choice because it costs less and is simpler to use.

Those looking for a horse race between the two distribution media will be disappointed. The most likely scenario will find CD-ROM and online services coexisting peacefully as they evolve, and even working together in some cases. Comparisons of the two are as instructive as they are inevitable. There is much to be learned in observing how they stack up at present and exploring how technological advances will affect the costs of both CD-ROM and online distribution.

CD-ROM TECHNOLOGY COMPARED TO ONLINE: COSTS, ADVANTAGES, AND DISADVANTAGES

One of the main selling points of online services is instant access to vast amounts of data that can be updated daily, hourly or even more frequently. The high cost associated with frequent updating, among other factors,

results in relatively high prices for data. Less time-sensitive material can usually be provided more cheaply by CD-ROM, with its relatively high-capacity and cost-efficient data storage capabilities.

Costs And Advantages Of CD-ROM

Delivering and accessing information by CD-ROM involves a variety of development, manufacturing and hardware costs. The cost of data preparation, a major aspect of development, ranges from a few thousand dollars for a small project to several hundred thousand dollars for a large one. Manufacturing a standard CD-ROM currently costs about \$1 per unit in pressing quantities of 1,000, with mastering fees adding approximately \$700 to the total.

Manufacturing costs are unaffected by the amount of data contained on the disc, which currently tops out around 700 megabytes without compression. Thus, excluding fulfillment and postage charges but including mastering fees, the current unit cost of delivering 700 megabytes of data by CD-ROM is well under \$2, and drops quickly as pressing quantities increase. The hardware component is the CD-ROM drive, which now adds less than \$100 to the cost of a new computer. Other varied but generally minor additional costs may include rights payments, licensing fees for authoring and search software, packaging, and documentation.

A comparison of the costs of providing the same amount of information by online service, print, diskette, and CD-ROM, finds CD-ROM's advantages writ large. Here's a typical breakdown: The online charge for downloading a one-megabyte file from the Federal Bulletin Board at 9600bps plus an estimated telecommunications charge is compared to the print equivalent of one megabyte, represented by the unit paper, printing, and binding cost of a 400-page book in a 1,000-copy printing. The cost of a diskette includes duplication charges for the data, along with the physical medium itself. For CD-ROM, the per-megabyte cost equals 1/700 of the manufacturing cost of the disc and a pro rata share of mastering fees. While each medium is cost-effective in its proper context, the evidence that CD-ROM offers the lowest cost storage and delivery of data is irrefutable.

Comparing CD-ROM and online further, both require development and data preparation. Both require customers to have specialized hardware-drives for CD-ROM and modems for online. Even though drives are some what more expensive than modems, the difference is not great enough to affect the cost comparison.

CD-ROM's huge storage capacity allows text, images (both still and video), and audio files to be combined, thereby providing the basis for interactive multimedia products. While it is technically possible to transmit video images and multimedia presentations by means of standard phone lines, the time needed to do so makes it impractical.

CD-ROM gives publishers total control over how their information is presented and sold to customers. Unless a publisher is willing to develop an independent online service--a costly proposition--offerings must be made by licensing information to commercial online services, that use their interfaces as the presentation vehicle. With CD-ROM, publishers maintain a direct relationship with their customers, thus controlling sales and P & L results.

Costs And Advantages Of Online Delivery

The basic costs incurred in transmitting information online are represented by telecommunications charges, which cover data transfers over local lines and packet networks, and by connect time charges, which cover the costs of network servers, maintaining databases and royalty payments to providers. A modem is needed to link the customer's workstation with the central computer. Customers must still pay their local phone company monthly service charges for an extra line, however, or use an existing phone line.

Business and professional online services, which account for over 90% of the \$13-billion U.S. online industry, typically separate telecommunications

charges from connect-time charges. As with long-distance phone service, telecommunications rates vary by time of day. Typical charges are \$8 to \$12 per hour for daytime use. The variance in connect-time charges is much greater, ranging from a few dollars per hour for a government-produced database to more than \$300 per hour for a highly specialized scientific database. The typical connect-time cost for searching commercial scientific and business databases is around \$100 per hour--calculated in minutes--a figure that has remained stable for several years.

In the small, fast-growing and highly competitive consumer segment, pricing of online services is less predictable. While the major services offer specialized data at premium rates, pricing policies are designed to encourage high-volume usage of basic services. America Online customers, for instance, use the service's communications features--e-mail and "chat"--more than its information retrieval options. Monthly charges of \$10 or less cover a limited--or unlimited, in the case of at least one service--amount of basic services usage. For additional use or for special services, customers pay a few dollars and up per hour for both telecommunications premiums and access time.

Higher transmission speeds tend to affect transaction costs positively, since the faster the data transfer, the shorter the connect-time needed (although the time a customer spends online in entering and refining a search strategy is unaffected by transmission speed). Although this practice seems to be fading, many commercial online services have traditionally lessened this apparent advantage by charging users more for data sent at higher speeds, typically doubling connect-time charges for data sent at 9600bps versus 2400bps. But as long as customers accord comparable value to the offering, the prices are regarded as fair. For example, brokers are quite willing to pay for up-to-the-minute stock quotes, which can be provided efficiently and economically online.

Due to the interactive nature of such online services and the need for low error rates, speeds below 9600bps are still widely used. The Table above demonstrates that online transmission is cost-effective for downloading only small amounts by calculating the time needed to transfer the contents of a standard CD via modem.

In order to serve multiple users accessing a database simultaneously, online services require large, costly computer systems. The systems must be operated and maintained 24 hours a day, 365 days a year, with enough capacity to handle service peaks comfortably. As with PCs, large system costs have been declining. Still, the cost of operating and maintaining a data center must be passed along to customers.

One of the driving forces behind the acceptance and success of commercial online services has been their ability to price data for occasional use. Because the services control and monitor each customer's access to databases, they are able to bill customers for connect-time and other uses such as printing. Though charges are still predominantly based on access time measured in hours or minutes, some services have moved to output-based pricing, which benefits less efficient searchers by reducing some of the time pressure. One service, for instance, has recently replaced connect-time charges with a pricing scheme that charges \$1.50 per 1,000 characters (including spaces and returns) viewed. Another now separates royalty payments from connect-time charges, which flattens rates.

Usage, or pay-as-you-go, pricing offers advantages to both service provider and customer. Online services can offset their high costs by employing the pricing model that offers the greatest revenue-generating potential. Customers benefit by being able to purchase small amounts of high-value data as needed. For these reasons, online providers serving business and other professional markets will continue to rely on usage-based charges in one form or another as the primary way of selling their information.

TURNING CD-ROM DISADVANTAGES INTO ADVANTAGES

We mentioned earlier that the main advantage of online compared to CD-ROM

is its ability to provide current information or highly specialized information economically. Two enhancements allow CD-ROM users to reap the same benefits as their online counterparts: Hybrid systems, which provide timely data transmission by allowing the two to work in tandem; and usage-pricing structures implemented through encryption technology to provide and exceed in cost-efficiency the pay-as-you-go convenience of some online systems.

Hybrid Systems Offer Both CD And Online Capabilities

Hybrid systems provide the capability for doing basic research on CD-ROM and updating information by means of online searches. In such a hybrid system the cost of using an online service would be a fraction of a usual search, since telecommunications and connect-time charges are kept to a minimum. This approach combines the advantages of both online and CD systems.

For example, Knight-Ridder Information, Inc., a leader in business and professional markets, offers many databases in both CD-ROM and online formats. Its Dialog Link(R) communications software allows customers to transfer searches from CD to online databases in order to obtain the most current data. In another hybrid application developed by the consumer online services, CD-ROMs are used to deliver graphics and related multimedia enhancements to online offerings.

Further advances in technology will offer publishers new ways to provide customers with updates of CD-ROM databases. The system developed by Teleshuttle Corporation, for example, uses a communication module on the CD to transfer up-to-the minute information from a central server to the user's hard disk by means of a modem link. This approach permits publishers to integrate frequent updates with CD databases while maintaining control over the user interface and terms of sale.

Encryption And Metering Technology Makes Usage Pricing Of CD Information Feasible

Combining encryption technology with usage-tracking software allows CD information to be sold on a usage basis. [See "CD-ROM Pricing: The Pay. As-You-Go Option," CD-ROM Professional, September/October, 1994] This advance radically enhances CD-ROM's ability to meet the demands of the marketplace and compete even more effectively with online distribution. Since telecommunications and connect-time charges are not cost factors in delivering information on CD, usage pricing of CD information can be based on measures other than time--a point that will make customers happy. A search that might cost \$25 from a commercial online service could be priced at half that amount or less on CD, and still allow a substantial profit for the information provider.

In addition to alleviating time pressure, usage pricing of CD information promises much lower base fees, which will allow customers to acquire many more titles. Because of the inherently low costs of delivering and accessing data on CD, this new method of charging for information gives providers great latitude in deciding how to make their pricing flexible, predictable and market-sensitive.

One CD-ROM-oriented usage pricing system from CD-MAX, Inc. combines proprietary encryption and usage-tracking software with communications and database programs. This approach allows CD information to be decrypted by registered customers, whose searches are then recorded in a special "watch" file. To gain continuing access to the CD, customers must allow security keys installed on the hard disk to be updated periodically. Customers are then billed for usage as directed by the publisher.

A practical **usage** pricing mechanism for CD information allows publishers to **charge** LAN users on a pay-as-you-go basis, thereby eliminating or lessening its dependence on inflexible (and ineffective, from a security standpoint) multiple-user licenses. Encryption and metering technology also enable the **distribution** of CD-based **information** on wide-area networks, by securing copyrights and permitting publishers to **charge** for actual

use.

WHAT'S IN STORE FOR CD-ROM AND ONLINE: THE POSSIBILITIES AND THE COSTS

CD-ROM is still in its first generation; the technology is by no means mature. Compared to the evolution of computers, current CD technology can be likened to the technology of Apple II days, when 32-bit processors were only theoretical possibilities. Those who would dismiss CD-ROM as a "transitional" medium can only do so by ignoring ongoing advances in optical publishing technology.

Reader Capabilities And Disc Capacity Increases Likely In Three To Five Years

In the years ahead, improvements in reader performance will offer greater convenience and better value for customers. Double speed readers, already the industry norm, are being replaced by quadruple speed readers as their prices decrease. Prices of multidisc changers, which further improve access speed and convenience, are bound to drop as a result of the large manufacturing base established for CD audio equipment. Lastly, prices of CD-R drives will continue to fall, which in turn will lower development costs and broaden the market for desktop CD-publishing applications.

Other exciting improvements lie ahead in disc capacity and performance. Philips is likely to introduce high-density video CD-ROM in late 1995 or early 1996 to satisfy the market's demand for a way to put full-length movies on a medium less costly than videotape. High-density CD-ROM will quickly follow. In both cases, the new format will increase disc capacity from the current ISO standard of 658MB to 3.3 gigabytes--a fivefold increase. Once the new format has an established hardware and manufacturing base, per-megabyte information delivery costs will decrease dramatically. Data that cost less than one-quarter of a cent to store on CD-ROM today will cost just a few hundredths of a cent in the near future.

High-density CD is made possible through incremental increases in the frequency of the laser used to read data--initially from infrared to red--which allows more efficient use of disc space. Frequency-doubled lasers, which shift the wavelength from red to blue-green, are reportedly in prototype stages. Another approach nearing commercialization uses multilayered discs to increase data density. In fact, the forthcoming new standard for high-density CDs includes optional specifications for double-layer CDs--a powerful one-two punch indeed.

Improvements in local and wide-area networking technology will make CD databases even more economical and accessible.

Dramatic Cost Reductions Unlikely In Online Delivery

Online cost factors have remained relatively stable for years. In contrast to CD-ROM, no dramatic cost reductions are likely to arise from technological advances in online's near future. Rates for telecommunications charges, for example, have already been reduced as a result of deregulation and the widespread use of fiber optic technology for long-distance calls. Overhead and royalty costs, the basic factors represented by connect-time charges or output-based equivalents, are even less responsive to technological advances.

Video-on-demand, which for many is the apotheosis of the information superhighway, requires huge improvements in bandwidth pipelines. Fiber optic technology, which allows the necessary increase in bandwidth, is cost-effective for long-distance trunk lines but not for individual home connections, even if implemented on the massive scale required to build a large consumer base. The establishment of digital networks using fiber optic technology may be at least a decade away.

The Internet seems to offer publishers an online alternative, though early uses deliver free marketing--not commercial-information. Even after the technical, marketing, security, and pricing issues involved in delivering

for-sale information on the Internet are worked out, the same question of cost remains: Will customers pay extra for online access if the same information is available in a lower-cost format?

For the foreseeable future, online services of all kinds will depend on large computer installations, whose costs must be passed along to customers.

Hidden Costs Of Realizing The National Information Infrastructure: The Numbers Don't Add Up

Will the National Information Infrastructure (NII) envisioned by the Clinton administration offer a less costly and more powerful alternative to the commercial technologies currently in use? Someday, perhaps, but many obstacles must be overcome before the NII can be realized--especially its more visionary aspects. A welter of regulatory, political, and technical issues must be untangled. And cost issues are equally daunting.

Building the NII will require replacing the current information delivery system at a huge cost. In economic terms, new technologies make sense when the cost of maintaining the performance of an existing system is greater than the total cost of installing and maintaining a new system, plus the value of the extra services provided by the new system. Thanks in large measure to the dynamism of CD-ROM technology, the cost/performance ratio of the existing system is actually improving, which pushes farther out into the future the day when the NII will be feasible. The information delivery system we have today is practical, cheap and rapidly improving--so, long live the "transition!"

John David Wiedemer, senior vice president of operations of CD-MAX, Inc., developed and patented the technology utilized in the company's security and billing services. Wiedemer holds a Ph.D. in the economics of technology from the University of Wisconsin-Madison. David B. Boelio is CD-MAX's executive vice president, marketing and sales. Communications to the authors may be addressed to CD-MAX, Inc., Suite 203, 219 South Street, Murray Hill, NJ 07974; 908/771-0022; Fax 908/771-0444.

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New distribution option for electronic publishers

O Connor, Mary Ann

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ABSTRACT: Software developers currently spend a great deal of time and money duplicating floppy disks and documentation. At the same time, software prices are dropping, further shrinking revenues. Information providers are faced with selling customers large databases of information, much of which they cannot use, at relatively high prices. For both environments, the existing methods for distribution of information or software are proving to be inadequate for the growing information age and the way people need to access information. National Semiconductor, in conjunction with Wave Systems Corp., is developing the iOpener system to address the question of how to continue to be profitable while selling products at lower prices and how to streamline the distribution of information products. The iOpener technology is based on the concept that whatever the customer uses is paid for and that the customer pays only for what is needed. While the iOpener system will not be specific to any delivery system, its first products will use existing CD-ROM technology.

TEXT: I recently attended a presentation on CD-ROM and multimedia which was sponsored by Dataware, Adobe, Emerging Technology Applications (ETA), IDG, Sony, and Hitachi. A particularly interesting portion of the program featured a presentation by Mr. Sandy Sanderson, Director of Business Development for the iPower Strategic Business Unit of National Semiconductor.

Sanderson introduced a new technology for information distribution that is currently under development at National Semiconductor. This innovative concept promises to open new doors into the world of electronic publishing for many information providers and software developers. First, a little background.

Software developers currently spend a great deal of time and money duplicating floppy disks and documentation. Distribution channels often eat into profits in exchange for increased competition for shelf space and distribution muscle. At the same time, software prices are dropping, further shrinking revenues.

Information providers are faced with selling customers large databases of information, much of which they cannot use, at relatively high prices. This tends to limit their potential markets for the information contained within these databases.

For both environments, the existing methods for distribution of information or software are proving to be inadequate for the growing information age and the way people need to access information.

A REAL EYE OPENER

National Semiconductor, in conjunction with Wave Systems Corp., is developing the iOpener system to address the questions of how to continue to be profitable while selling products at lower prices and how to streamline the distribution of information products. The iOpener technology is based upon the concept that whatever the customer uses is paid for and that the customer pays only for what he/she uses. The result is a type of information meter.

While the iOpener system will not be specific to any delivery system, its first products will use existing CD-ROM technology. By combining encryption technology and metering capability. Wave Systems

has developed an **information distribution** system which enables **information** providers and users to track and monitor **information usage** on a pay-per-view basis. Specifically, CD-ROM discs are used as the storage media, **encryption** protects the data on the CDs from illegal access; a chip or board installed in a PC or LAN server functions as the meter; and the specific **usage** is recorded and **billed** at Wave's processing center. The underlying principles are that the consumer pays only for the specific data used, and the publisher is protected from illegal distribution and gains specific market feedback regarding what information is being purchased.

Wave Systems Corp. and National Semiconductor are building partnerships with industry leaders in order to promote this distribution system as the new industry standard. National Semiconductor has been given the license to manufacture the meter or chip; National Data Corp. is providing the centralized processing system which will track all purchases made at the desktop; and Personal Library Software will provide one of the search interfaces for the CD-ROMs. Wave Systems will determine all encryption algorithms, maintain the management system, handle billing functions, develop relationships with publishers, and market the system to various vertical industry segments.

A TWO STEP PROCESS

Wave's metering system is PC-based and involves two steps: encryption of data which protects information from unauthorized use, and metering which records retrieval of information by the consumer. Users are charged only for the information they use, not for online search time, printing, or for the entire contents of a CD!

ENCRYPTION OF DATA

Encryption of data is the first step in the process. Wave uses an encryption algorithm known as the Data Encryption Standard (DES) to encrypt all information before it is provided to consumers on CDs. Wave encrypts the data according to the publisher's instructions. For example, the publisher can decide how to package the information--whether to sell it by the paragraph, the page, the article, or the picture--and Wave can then encrypt it accordingly. Once encrypted, the information cannot be retrieved from the CD without being "decrypted" and recorded on the Wave meter. This process protects the data from illegal or unauthorized use.

METERING USAGE

The Wave System uses a small computer board or chip that incorporates the decryption technology with a metering capability. The meter is placed within the user's desktop PC or LAN server and is activated as soon as an end-user wants to retrieve a "package" of information. The meter records the user's statistics (name, billing code, etc.), checks the password, decrypts the information for the user, and creates a billing record of what information was purchased. Periodically, the meter automatically dials Wave's operations center using its built-in modem and uploads all transaction records. These records are then used to generate monthly bills and usage reports. The bills can be set up according to projects, departments, clients, or end-users, so that customers can create any bill-back procedures that are helpful. Publishers, in turn, can obtain direct feedback on what parts of their information products are being used by the market.

INFORMATION RETRIEVAL BY THE USER

The Wave system enables consumers to have immediate desktop access to virtually any information related to their professional or personal needs. For example, a consumer can maintain a desktop library of encrypted CDs at little or no cost; the CDs sit unused until the user needs and retrieves a specific piece of information or software. The user is not charged for search time or for browsing titles and abstracts that come up in response to a search. A cost is incurred only when the consumer decides to purchase the full text of an article or document, or perhaps buy a piece of clip art, or rent or buy a software package or video game. At that point, the

- user is informed of the price, and the data is immediately decrypted as the purchase is recorded by the Wave meter.

COMMERCIAL AVAILABILITY

Wave Systems is currently conducting a beta test of its metering system within the legal and accounting markets. The first version of the system being tested is a standalone version; a network version will be tested shortly. Wave is simultaneously building partnerships to promote the new system. Commercial introduction of the Wave system is planned for early 1994.

FOR MORE INFORMATION

Wave Systems Corp. 885 Third Avenue, 26th Floor New York, NY 10022
212/755-3282 Fax 212/755-3436

National Semiconductor 2900 Semiconductor Drive Santa Clara, CA 95052-8090
408/721-6224 Fax 408/245-7906

Communications to the author may be addressed to Mary Ann O'Connor, P.O. Box 50114, Colorado Springs, CO 80949; 719/598-8942.

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